SEQUENCE LISTING

<110> Trimeris, Inc.
Delmedico, Mary K.
Dwyer, John

<120> HIV-1 DERIVED HR1 PEPTIDES MODIFIED TO FORM STABLE TRIMERS, AND THEIR USE IN THERAPY TO INHIBIT TRANSMISSION OF HUMAN IMMUNODEFICIENCY VIRUS

<130> 7872-121-999 (TRM-001)

<140> 10/664,021
<141> 2003-09-16

<150> US 60/414,514
<151> 2002-09-27

<160> 118

<170> PatentIn version 3.2

<210> 1
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<212> PRT
<213> Human immunodeficiency virus type 1

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Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
1 5 10 15

Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
20 25 30

Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val
35 40 45

Glu Arg Tyr Leu Lys Asp Gln Leu Leu Gly Ile
50 55

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<213> Artificial Sequence

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Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
1 5 10 15

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu
20 25 30

Arg Tyr Leu Lys Asp Gln
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<220>
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Gly Ser Thr Met Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg
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Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala
20 25 30

Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
35 40

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Gly Ser Thr Met Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg
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Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala
20 25 30

Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys
35 40 45

Gln Leu Gln Ala Arg Ile
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Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
1 5 10 15

Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln
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Gln His Leu Leu
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Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
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Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln
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Gln His Leu Leu Gln Leu
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Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
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Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln
20 25 30

Gln His Leu Leu Gln Leu Thr Val
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Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
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Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln
20 25 30

Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala
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Arg Ile
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Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly
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Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln
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His Leu Leu Gln
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Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile
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Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His
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Leu Leu Gln Leu
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Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val
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Leu Gln Leu Thr
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Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
20 25 30

Gln Leu Thr
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Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
20 25 30

Gln Leu Thr Val
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20 25 30

Leu Thr

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Leu Thr Val
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Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
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Leu Thr Val Trp
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Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
20 25 30

Leu Thr Val Trp Gly
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Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
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Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
20 25 30

Leu Thr Val Trp Gly Ile
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Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
20 25 30

Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg
35 40

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Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln
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Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
20 25 30

Thr Val Trp Gly
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<400> 21

Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
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Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
35 40

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Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
1 5 10 15

Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr
35 40 45

<210> 23
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Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
1 5 10 15

Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys

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Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys Asp Gln

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Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
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Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Ile Leu
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<400> 26

Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15

Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40 45

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Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
1 5 10 15

Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
20 25 30

Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40

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<400> 28

Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly
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Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys
20 25 30

Asp Gln

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<400> 29

Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
1 5 10 15

Leu Gln Leu Thr Ala Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
20 25 30

Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40

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Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
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Leu Gln Leu Thr Val Ala Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
20 25 30

Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40

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Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
1 5 10 15

Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Phe
20 25 30

Gly Ile Arg Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys

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Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
1 5 10 15

Leu Arg Ala Ile Glu Ala Gln Gln His Ala Leu Gln Ala Thr Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys

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Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu Ile His
1 5 10 15

Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu
20 25 30

Leu Leu Glu Leu
35

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Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
1 5 10 15

Leu Arg Ala Ile Glu Ala Gln Gln His Ala Leu Gln Ala Thr Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys Asp Gln
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Gln Ala Arg Gln Leu Val Ser Gly Leu Val Gln Gln Gln Asn Asn Ile
1 5 10 15

Leu Arg Ala Leu Glu Ala Thr Gln His Ala Val Gln Ala Leu Val Trp
20 25 30

Gly Val Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
35 40 45

Lys

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Gln Ile Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
1 5 10 15

Leu Arg Ala Ile Glu Ala Ile Gln His Ala Leu Gln Ala Ile Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys

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Gln Ala Arg Gln Leu Val Ser Gly Leu Val Gln Gln Gln Asn Asn Ile
1 5 10 15

Leu Arg Ala Leu Glu Ala Thr Gln His Ala Val Gln Ala Leu Val Trp
20 25 30

Gly Val Arg Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
35 40 45

Lys

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Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
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Leu Arg Ala Ile Glu Ala Thr Gln His Ala Val Gln Ala Leu Val Trp
20 25 30

Gly Val Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
35 40 45

Lys Asp Gln
50

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Gln Ala Arg Gln Leu Val Ser Gly Leu Val Gln Gln Gln Asn Asn Ile
1 5 10 15

Leu Arg Ala Leu Glu Ala Gln Gln His Ala Leu Gln Ala Thr Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
35 40 45

Lys Asp Gln
50

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1 5 10 15

Leu Arg Ala Ile Glu Ala Gln Gln His Ala Leu Gln Ala Thr Val Trp
20 25 30

Gly Val Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys Asp Gln
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1 5 10 15

Leu Arg Ala Leu Glu Ala Thr Gln His Leu Val Gln Leu Leu Val Trp
20 25 30

Gly Val Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
35 40 45

Lys

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<400> 42

Gln Ile Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu

1 5 10 15

Leu Arg Ala Ile Glu Ala Ile Gln His Leu Leu Gln Leu Ile Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys

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Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
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Leu Gln Leu Thr Val Phe Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
20 25 30

Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40

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Leu Gln Leu Thr Val Trp Gly Ile Ala Gln Leu Gln Ala Arg Ile Leu
20 25 30

Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40

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Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
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Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Ala Ala Arg Ile Leu
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Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40

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Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
20 25 30

Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40

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atcctggctg ttgaacgtta cctgaaa 147

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gaagctaccc agcacgctgt tcaggctctg gtttggggtg ttaaacagct gcaggctcgt 120

gttctggctc tggaacgtta catcaaa 147

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cag 123

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gttgctggta tcaaacagct gcaggctcgt atcctggctg ttgaacgtta cctgaaagac 120

cag 123

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gaggcccagc agcacgccct gcaggccacc gtgtggggca tcaagcagct gcaggcccgc 120

atcctggccg tggagcgcta cctgaag 147

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gaggccaccc agcacgccgt gcaggccctg gtgtggggcg tgaagcagct gcaggcccgc 120

gtgctggccc tggagcgcta catcaag 147

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atcctggccg tggagcgcta cctgaag 147

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cag 123

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cag 123

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Trp Xaa Xaa Trp Xaa Xaa Xaa
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<400> 60

Trp Xaa Xaa Trp Xaa
1 5

<210> 61
<211> 4
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<220>
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<220>
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<222> (2)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 61

Trp Xaa Xaa Trp
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<210> 62
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<223> Xaa can be any naturally occurring amino acid

<220>

<221> misc_feature
<222> (8)..(8)
<223> Xaa can be any naturally occurring amino acid

<400> 62

Trp Xaa Xaa Xaa Trp Xaa Trp Xaa
1 5

<210> 63
<211> 7
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<213> Artificial Sequence

<220>
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<220>
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<223> Xaa can be any naturally occurring amino acid

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<222> (7)..(7)
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<400> 63

Xaa Xaa Xaa Trp Xaa Trp Xaa
1 5

<210> 64
<211> 6
<212> PRT
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<220>
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<223> Xaa can be any naturally occurring amino acid

<220>
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<222> (6)..(6)
<223> Xaa can be any naturally occurring amino acid

<400> 64

Xaa Xaa Trp Xaa Trp Xaa
1 5

<210> 65
<211> 5
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<213> Artificial Sequence

<220>
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<220>
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<220>
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<223> Xaa can be any naturally occurring amino acid

<220>
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<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<400> 65

Xaa Trp Xaa Trp Xaa
1 5

<210> 66
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<212> PRT
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<220>
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<223> Xaa can be any naturally occurring amino acid

<220>
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<222> (4)..(4)
<223> Xaa can be any naturally occurring amino acid

<400> 66

Trp Xaa Trp Xaa
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<210> 67
<211> 7
<212> PRT
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<220>

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<220>
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<220>
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<222> (6)..(6)
<223> Xaa can be any naturally occurring amino acid

<400> 67

Trp Xaa Xaa Xaa Trp Xaa Trp
1 5

<210> 68
<211> 6
<212> PRT
<213> Artificial Sequence

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<220>
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<223> Xaa can be any naturally occurring amino acid

<400> 68

Trp Xaa Xaa Xaa Trp Xaa
1 5

<210> 69
<211> 5
<212> PRT
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<220>
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<220>
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<223> Xaa can be any naturally occurring amino acid

<400> 69

Trp Xaa Xaa Xaa Trp
1 5

<210> 70
<211> 8
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<220>
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<220>
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<220>
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<223> Xaa can be any naturally occurring amino acid

<400> 70

Ile Xaa Xaa Xaa Trp Xaa Xaa Trp
1 5

<210> 71
<211> 7
<212> PRT
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<220>
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<220>
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<222> (5)..(6)
<223> Xaa can be any naturally occurring amino acid

<400> 71

Xaa Xaa Xaa Trp Xaa Xaa Trp
1 5

<210> 72
<211> 6
<212> PRT
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<220>
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<220>
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<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (4)..(5)
<223> Xaa can be any naturally occurring amino acid

<400> 72

Xaa Xaa Trp Xaa Xaa Trp
1 5

<210> 73
<211> 5
<212> PRT
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<220>
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<220>
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<222> (3)..(4)
<223> Xaa can be any naturally occurring amino acid

<400> 73

Xaa Trp Xaa Xaa Trp
1 5

<210> 74
<211> 8
<212> PRT
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<220>
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<220>
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<220>
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<222> (5)..(7)
<223> Xaa can be any naturally occurring amino acid

<400> 74

Xaa Trp Xaa Trp Xaa Xaa Xaa Trp
1 5

<210> 75
<211> 7
<212> PRT
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<220>
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<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (5)..(7)
<223> Xaa can be any naturally occurring amino acid

<400> 75

Xaa Trp Xaa Trp Xaa Xaa Xaa
1 5

<210> 76
<211> 6
<212> PRT
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<223> Xaa can be any naturally occurring amino acid

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<221> misc_feature
<222> (5)..(6)
<223> Xaa can be any naturally occurring amino acid

<400> 76

Xaa Trp Xaa Trp Xaa Xaa
1 5

<210> 77
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
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<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 77

Xaa Trp Xaa Trp
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<210> 78
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<222> (4)..(6)
<223> Xaa can be any naturally occurring amino acid

<400> 78

Trp Xaa Trp Xaa Xaa Xaa Trp
1 5

<210> 79
<211> 6
<212> PRT
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<400> 79

Xaa Trp Xaa Xaa Xaa Trp
1 5

<210> 80

<211> 7
<212> PRT
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<220>
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<222> (6)..(7)
<223> Xaa can be any naturally occurring amino acid

<400> 80

Trp Xaa Xaa Xaa Trp Xaa Xaa
1 5

<210> 81
<211> 51
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide; X is any amino acid

<400> 81

Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Asn Asn Leu
1 5 10 15

Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Ala Thr Val Trp
20 25 30

Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
35 40 45

Lys Asp Gln
50

<210> 82
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide; X is any amino acid

<400> 82

Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
1 5 10 15

Leu Gln Ala Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
20 25 30

Ala Val Glu Arg Tyr Leu Lys Asp Gln

35 40

<210> 83
<211> 122
<212> PRT
<213> Human immunodeficiency virus type 1

<400> 83
Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
1 5 10 15
Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
20 25 30
Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val
35 40 45
Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Trp Asn Ala Ser Trp Ser
50 55 60
Asn Lys Ser Leu Glu Gln Ile Trp Asn Asn Met Thr Trp Met Glu Trp
65 70 75 80
Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu Ile His Ser Leu Ile Glu
85 90 95
Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu
100 105 110
Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
115 120

<210> 84
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 84
Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
1 5 10 15
Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu
20 25 30
Arg Tyr Leu Lys Asp Gln
35

<210> 85
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 85
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
1 5 10 15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
20 25 30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
35 40

<210> 86
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 86
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 87
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 87
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 88
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 88
Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Leu Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Arg Asp Gln Gln
        35   40

<210> 89
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 89
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 90

<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 90
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Thr Arg Val Leu Ala
            20   25   30
Ile Glu Arg Tyr Leu Gln Asp Gln Gln
        35   40

<210> 91
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 91
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Arg Asp Gln Gln
        35   40

<210> 92
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 92
Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Lys
        35   40

<210> 93
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 93
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Gln Asp Gln Gln

35 40

<210> 94
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 94
Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
1 5 10 15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Leu Glu Arg Tyr Leu Arg Asp Gln Gln
35 40

<210> 95
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 95
Gln Gln Asn Asn Leu Leu Met Ala Ile Glu Ala Gln Gln His Met Leu
1 5 10 15
Glu Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
35 40

<210> 96
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 96
Gln Gln Asn Asn Leu Leu Arg Ala Ile Lys Ala Gln Gln His Leu Leu
1 5 10 15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
20 25 30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
35 40

<210> 97
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 97
Gln Gln Asn Asn Leu Leu Arg Ala Ile Asp Ala Gln Gln His Leu Leu
1 5 10 15

Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 98
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
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<400> 98
Gln Gln Asn Asn Leu Leu Arg Ala Ile Lys Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 99
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
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<400> 99
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Gly Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 100
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 100
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Ser Tyr Leu Lys Asp Gln Gln
        35   40

<210> 101
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 101
Gln Gln Thr Asn Met Leu Lys Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 102
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 102
Gln Gln Thr Ser Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Arg Asp Gln Gln
        35   40

<210> 103
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 103
Gln Gln Asn Asp Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Leu Glu Gly Tyr Leu Gln Asp Gln Gln
        35   40

<210> 104
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 104
Gln Gln Asn Asn Met Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Arg Asp Gln Gln
        35   40

<210> 105
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 105
Gln Gln Ser Asn Leu Met Arg Ala Ile Glu Ala Leu Gln His Met Val
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 106
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 106
Gln Gln Ser Asn Leu Met Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35   40

<210> 107
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<221> VARIANT
<222> 3
<223> Xaa = Any Amino Acid

<400> 107
Gln Gln Xaa Asn Leu Leu Arg Ala Met Glu Ala Gln Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Leu Glu Arg Tyr Leu Arg Asp Gln Gln
        35   40

<210> 108
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 108
Gln Gln Asn Asp Leu Leu Arg Gly Ile Asp Ala Pro Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Trp Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30

Val Glu Arg Tyr Leu Arg Gly Gln Gln
35 40

<210> 109
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 109
Gln Gln Asn Ser Leu Leu Gln Ala Ile Glu Ala Gln Gln Arg Met Leu
1 5 10 15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
35 40

<210> 110
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 110
Gln Gln Asn Asp Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
1 5 10 15
Arg Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Leu Glu Arg Tyr Leu Arg Asp Gln Gln
35 40

<210> 111
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 111
Gln Gln Thr Asn Met Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
1 5 10 15
Gln Leu Thr Val Trp Ser Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
35 40

<210> 112
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 112
Gln Arg Ser Asn Leu Leu Lys Ala Ile Glu Ala Gln Gln Gln Met Trp

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 1               5                   10                  15
Arg Leu Thr Val Trp Gly Phe Lys Gln Leu Gln Ala Arg Leu Leu Ala
            20                  25                  30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35                  40
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<210> 113
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 113

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Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1               5                   10                  15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Arg Ala Arg Val Leu Ala
            20                  25                  30
Ile Glu Arg Tyr Leu Lys Asp Gln Gln
        35                  40
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<210> 114
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 114

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Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1               5                   10                  15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Pro Gly
            20                  25                  30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
        35                  40
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<210> 115
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 115

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Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1               5                   10                  15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20                  25                  30
Val Lys Arg Tyr Leu Arg Asp Gln Gln
        35                  40
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<210> 116
<211> 41
<212> PRT
<213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 116
Glu Arg Asn Lys Leu Arg Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Ser Leu Lys Asp Gln Gln
        35   40

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Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Arg Asp Gln Gln
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<400> 118
Gln Gln Asn Asp Leu Leu Arg Gly Ile Asp Ala Pro Gln His Leu Leu
 1   5   10   15
Gln Leu Thr Val Trp Gly Val Lys Gln Leu Gln Ala Arg Val Leu Ala
            20   25   30
Val Glu Arg Tyr Leu Arg Gly Gln Gln
        35   40